

REMARKS***Summary of the Response***

In the present amendment, claims 1 and 6 have been amended for the Examiner's consideration. More specifically, claims 1 and 6 have been amended to recite that "said surface of the copper foil has not undergone a roughening treatment and has a surface roughness (Rz) of less than 2 μm ." Applicants submit that no new matter has been added.

Support for the amendment may be found, for example, at least in original claims 1 and 6, and page 7, lines 1 - 10 of the specification. While acknowledging that the instant specification discusses a surface roughness (Rz) of 2 μm or less, Applicants submit that a surface roughness (Rz) of 2 μm or less shows Applicants' possession and contemplation of the presently claimed range of less than 2 μm . That is, Applicants submit that the disclosure of a surface roughness (Rz) of 2 μm or less, shows contemplation of the thin layer resin primer layer having a roughness of, for example, 1 μm , 1.1 μm , or 1.8 μm . As such, Applicants submit amending the claims to recite a surface roughness (Rz) of less than 2 μm is fully supported by the instant application.

Moreover, Applicants note that the examples discussed in the specification (see, e.g., page 21, lines 5 - 8) discuss a thin layer resin primer layer having a surface roughness (Rz) of 1.1 μm , which also lies within the presently claimed range. Applicants respectfully submit that one of ordinary skill in the art reading the instant specification would understand that the disclosure of a surface roughness (Rz) of 2 μm or less shows the contemplation by the present inventors of the smaller range of less than 2 μm .

Thus, for at least the above reasons, Applicants submit that no new matter has been added by the instant amendment.

Summary of the Office Action

In the instant Office Action, the Office has rejected claims 1 - 3, 5, 6, 8 - 11, 13, 14, and 16 - 18 over the art of record. By the present amendment and remarks, Applicants submit that the rejections have been overcome, and respectfully request reconsideration of the outstanding Office Action and allowance of the present application.

Amendment Proper for Entry

Applicants submit that the entry of the above amendment is proper. Applicants submit that the entry of the amendment is proper, since such amendment places the application in condition for allowance or, alternatively, places the application in better form for appeal.

Traversal of Rejection Under 35 U.S.C. § 103(a)

Applicants respectfully traverse the rejection of claims claim 1-3, 5, 6, 8-11, 13, 14, and 16 - 18 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,525,433 to Poutasse (hereinafter “POUTASSE II,”) in view of U.S. Patent No. 5,439,986 to Hosogane et al. [hereinafter “HOSOGANE”] or U.S. Patent No. 6,447,915 to Komiyatani et al. [hereinafter “KOMIYATANI”], and further in view of JP 10-190225 [hereinafter “JP ‘225”] or JP 11-148053 [hereinafter “JP ‘053”].

The Office bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the Office does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. See MPEP §2142. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or

motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.¹ Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Independent Claims 1, 6, and 8

The present invention is directed to a method for manufacturing a copper foil with an ultra thin adhesive layer. Claims 1 and 6 each recite, *inter alia*:

. . . a ultra thin primer resin layer of a thickness of 1 to 3 μm , wherein said surface of the copper foil has not undergone a roughening treatment and has a surface roughness (Rz) of less than 2 μm . . .

Claim 8 recites, *inter alia*:

. . . wherein the thickness of the resin layer is 1 to 3 μm .

Not Obvious to Modify POUTASSE II in the Manner Asserted

The Examiner acknowledges that none of the applied documents teaches or suggests a resin layer thickness of 1 to 3 μm . For example, in addressing claims 1, 6, and 8, the Examiner acknowledges that POUTASSE II fails to specifically teach or suggest the recited thickness

¹ While the *KSR* court rejected a rigid application of the teaching, suggestion, or motivation (“TSM”) test in an obviousness inquiry, the [Supreme] Court acknowledged the importance of identifying “a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does” in an obviousness determination. *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356-1357 (Fed. Cir. 2007) (quoting *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731 (2007)).

range of 1 to 3 μm . However, the Examiner asserts that it would have been obvious to modify POUTASSE II to arrive at the instantly claimed invention. Applicants respectfully disagree.

Applicants respectfully submit that it would not have been obvious to modify POUTASSE II in the manner asserted to provide an ultra thin primer resin layer of a thickness of 1 to 3 μm on a surface of a copper foil that has not undergone a roughening treatment and has a surface roughness (R_z) of less than 2 μm , as POUTASSE II teaches away from the Examiner-proposed modification. That is, the Examiner-proposed combination would either render POUTASSE II inoperable for its intended use, or change the principle of operation of POUTASSE II. Applicants note that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Applicants note that if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Additionally, Applicants note that if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

POUTASSE II is directed to epoxy adhesives and copper foils and copper clad laminates using the epoxy adhesives. POUTASSE II teaches providing a resin layer on a copper foil surface having a surface roughness of greater than 2 μm (see, e.g., column 8, line 56 - column 9, line 2). As noted above, the Examiner acknowledges that POUTASSE II fails to specifically teach or suggest the recited thickness range of 1 to 3 μm .

Applicants respectfully submit, however, that it is impossible to provide an ultra-thin primer resin layer having a thickness of 1 - 3 μm on a copper foil surface having a surface roughness that is greater than 2 μm , because unevenness of the surface is too big. As such, Applicants respectfully submit that it is impossible for one of ordinary skill in the art to achieve the recited thickness of the ultra-thin primer resin layer (i.e., a thickness of 1 - 3 μm) according to the technology of POUTASSE II, and using an ultra-thin primer resin layer having the recited thickness would render POUTASSE II inoperable and/or unsuitable for its intended purpose, and/or change the principle of operation of POUTASSE II.

As such, Applicants submit that it would not have been obvious to modify POUTASSE II as the Office asserts, as such a modification would change the principle of operation of POUTASSE II and/or render POUTASSE II unsuitable for its intended use.

As such, for at least these reasons, Applicants submit there is no suggestion or motivation to make the proposed modification and that the teachings of the references are not sufficient to render the present claims *prima facie* obvious.

No Teaching or Suggestion in JP'225 of an Ultra-thin Primer Resin Layer Having a Thickness of 1 - 3 μm

Additionally, Applicants submit that JP '225 does not teach or suggest an ultra-thin primer resin layer having a thickness of 1 - 3 μm . JP '225 is directed to the manufacture of a multilayer wiring board. JP '225 discloses a copper foil provides with an insulting adhesive layer to be bonded to an inner layer circuit board, which is processed with a black oxide treatment (a roughening treatment), as discussed at paragraph [0016]. Applicants note that JP '225 teaches (see Paragraph [0006] of computer-generated translation) a thickness of the

dielectric bonding layer to be 20 - 120 μm , and more preferably to be 40 - 70 μm to provide for productivity and/or a particularly desired electrical property. With JP '225, the insulating layer is bonded to the inner layer circuit board, which is in contrast to an ultra-thin primary resin layer bonded to a resin substrate, of the presently claimed invention.

Furthermore, because with JP '225, the insulating adhesive layer constitutes an inter layer insulating material of a multi-layered printed wiring board, this layer cannot be a thin layer of 1 - 3 μm , as a layer of such thickness would not provide a sufficient insulating material.

As such, for at least these reasons, Applicants submit that JP '225 provides no teaching or suggestion for an ultra-thin primer resin layer having a thickness of 1 - 3 μm , and that the teachings of the references are not sufficient to render the present claims *prima facie* obvious.

No Teaching or Suggestion in JP'053 of an Ultra-thin Primer Resin Layer Having a Thickness of 1 - 3 μm

Applicants further submit that JP '053 does not teach or suggest an ultra-thin primer resin layer having a thickness of 1 - 3 μm , and does not disclose a resin layer provided on a copper foil surface. As disclosed at paragraph [0026] of JP '053, a resin layer having a thickness of 25 -50 μm is provided on a plastic film having a roughened surface (matte treated). Subsequently, the resin layer is bonded to an inner layer circuit. Thus, Applicants submit the resin layer of JP '053 is provided to bond with the inner layer circuit (and not to provide a resin layer that ensures bond strength with a resin substrate, as with the presently claimed invention).

The resin layer of JP '053 is provided to ensure bond strength to the inner layer circuit and to prevent development of the inner layer circuit on the resin surface. Applicants submit, however, that a resin layer thickness as recited in the instant claims (i.e., a thickness of 1 - 3 μm)

would not be sufficient to ensure bonding with the inner circuit layer and prevention of development of the inner layer circuit on the resin surface. Thus, Applicants submit that JP '053 provides no teaching or suggestion for an ultra-thin primer resin layer having a thickness of 1 - 3 μm , and that the teachings of the references are not sufficient to render the present claims *prima facie* obvious.

No Teaching Or Suggestion Of A Resin Flow Of The Ultra-Thin Primer Resin Layer When Measured In Accordance With MIL-P-13949G In The MIL Standard Is 5% Or Less, And For The Purpose Of The Resin Flow Measurement A Thickness Of The Ultra-Thin Primer Resin Layer Has Been Increased To 40 μm

In addressing this feature of the presently claimed invention, the Examiner acknowledges that none of POUTASSE II, HOSOGANE and KOMIYATANI teach or suggest a resin flow of the ultra-thin primer resin layer when measured in accordance with MIL-P-13949G in the MIL Standard is 5% or less, and for the purpose of the resin flow measurement a thickness of the ultra-thin primer resin layer has been increased to 40 μm . However, the Office asserts that JP '225 or JP '053 teach these features. Specifically, the Examiner states that:

JP '225 and JP '053 both teach the benefit of having a resin flow within the claimed range for the adhesive layer on a copper foil utilized in producing printed wiring boards (JP'225, Paragraph 0009; JP '053, Paragraphs 0008-0009) and hence one having ordinary skill in the art at the time of the invention would have been motivated to modify the invention as taught by JP '648 in view of Komiyatani or Hosagane [sic] et al such that the composition and viscosity of the adhesive layer was adjusted to provide a resin flow within the instantly claimed range.

Applicants respectfully disagree.

Applicants submit that neither JP '225 nor JP '053 teaches a resin flow of the ultra-thin primer resin layer when measured in accordance with MIL-P-13949G in the MIL Standard is 5%

or less, and for the purpose of the resin flow measurement a thickness of the ultra-thin primer resin layer has been increased to 40 μm , as recited in claims 1 and 6.

Applicants submit that JP'225, while discussing a *charge of a binder* which is 0.2% to 5.0% of range, does teach or suggest a *resin flow* of the ultra-thin primer resin layer is 5% or less. Moreover, Applicants respectfully submit that JP'225 is silent with respect to the resin flow being measured in accordance with MIL-P-13949G in the MIL Standard, and for the purpose of the resin flow measurement a thickness of the ultra-thin primer resin layer has been increased to 40 μm , as recited in claims 1 and 6. Thus, Applicants submit that JP '225 fails to teach or suggest a resin flow of the ultra-thin primer resin layer when measured in accordance with MIL-P-13949G in the MIL Standard is 5% or less, and for the purpose of the resin flow measurement a thickness of the ultra-thin primer resin layer has been increased to 40 μm .

Accordingly, for at least these reasons, Applicants submit that no reasonable combination of POUTASSE II, HOSOGANE or KOMIYATANI and JP '225 teaches or suggests each of the features of the presently claimed invention.

JP '053 is directed to a heat resistant plastic film laminate and multilayer printed circuit. While JP '053 may teach a resin flow of the resin layer in the range of 3.0 % to 5.0%, Applicants submit JP '053 fails to teach or suggest the claimed measuring method. Additionally, Applicants submit that the resin adhesive layer is not formed on a copper foil, but rather on a *heat-resistant film*. As such, Applicants submit that JP'053 fails to teach or suggest the advantage of having a resin flow within the claimed range for the adhesive layer on a *copper foil*, as the Examiner asserts in her statement of motivation for combining JP '053 with the other cited documents. Accordingly, Applicants submit that one of ordinary skill in the art would not be motivated to combine these documents in the manner asserted.

Furthermore, Applicants submit that JP '053 fails to teach or suggest a resin layer of 1 to 3 μm , as recited in claims 1, 6, and 8. Applicants submit that JP '053 discloses thickness of the adhesive layers (as discussed in the Examples) of 50 μm (see Paragraph [0026] of computer-generated translation), 25 μm (see Paragraph [0028]), and 30 μm (see Paragraph [0030]).

Therefore, for at least these reasons, Applicants submit that no reasonable combination of POUTASSE II, HOSOGANE or KOMIYATANI and JP '053 teaches or suggests each of the features of the presently claimed invention.

Accordingly, for at least these reasons, Applicants respectfully request the rejection of claims 1, 6, and 8 be withdrawn, and claims 1, 6, and 8 be indicated as allowable.

Dependent Claims 2, 3, 5, 9 - 11, 13, 14, and 16 - 18

Claims 2, 3, 5, 9 - 11, 13, 14, and 16 - 18 are allowable at least for the reason that these claims depend from respective allowable base claims, and further because these claims recite additional features that further define the present invention.


Accordingly, for at least these reasons, Applicants respectfully request the rejection of claims 2, 3, 5, 9 - 11, 13, 14, and 16 - 18 be withdrawn, and claims 2, 3, 5, 9 - 11, 13, 14, and 16 - 18 be indicated as allowable.

CONCLUSION

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections of record, and allow each of the pending claims. Applicants therefore respectfully request that an early indication of allowance of the application be indicated by the mailing of the Notices of Allowance and Allowability.

If there should be any questions, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully Submitted,
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